

Appl. No. 10/017,894
Response Dated June 21, 2004
Reply to Office Communication dated May 26, 2004

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AMENDMENTS

In The Specification:

On page 1, line 2 through 4, please amend as follows:

The present application claims ~~priority to~~ [the benefit of] the filing date of U.S. Provisional Patent Application Serial No. 60/272,548 filed on March 1, 2001 and entitled "A Pre-Fastened Absorbent Article Having Improved Fit and Fastening Features".

In the Summary of the Invention section, page 4, line 33, through page 9, line 30, please amend as follows:

The present invention is directed to a pant-like, prefastened, disposable absorbent article. The article includes an absorbent, a front waist region, a back waist region and a crotch region that extends between and connects the waist regions. In addition the article includes a longitudinal direction, a lateral direction, an exterior surface and an interior surface opposite the exterior surface. The article also includes a pair of laterally opposed side edges and a pair of longitudinally opposed waist edges. Further the absorbent article includes a multiple property fastener. The multiple property fastener defines a fastener longitudinal direction, a fastener lateral direction and a fastener area. The multiple property fastener further includes at least ~~can also include one or more engagement zones that include zone~~ of a first mechanical fastening material and at least one non-abrasive zone of a second mechanical fastening material. Additionally, the multiple property fastener is oversized to provide stability between the front waist region and the back waist region and to maintain the pant-like, prefastened configuration.

In another aspect of the present invention, the article may include one engagement zone covering one half of the fastener area in the fastener longitudinal direction and one non-abrasive zone covering the other half of the fastener area in the fastener longitudinal direction.

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In another aspect of the present invention, the first mechanical fastening material is made from a polypropylene copolymer. Alternatively the second mechanical fastening material is made from a polymer selected from elastomeric thermoplastic polymers and metallocene catalyzed polymers.

In another aspect of the present invention the multiple property fastener is engageable into the front waist region of the article. Alternatively the multiple property fastener is engageable into the back waist region of the article.

In yet another aspect of the present invention the multiple property fastener has a top edge that is generally aligned with one of the waist edges of the article.

~~Additionally, the multiple property fastener can include one or more non-abrasive zones that include a second mechanical fastening material. The engagement zones of the multiple property fastener can have a primary function of providing secure and reliable engagement into a loop material or other material or surface desired for engagement. The non-abrasive zones can have a primary function of providing engagement while being "skin friendly" or less likely to cause irritation of the skin with which these zones come into contact. The zones of the multiple property fastener of the invention can be configured to provide a fastener having a gradient of properties across the longitudinal direction or lateral direction of the fastener.~~

~~Various configurations of the engagement and non-abrasive zones can be utilized to form the multiple property fasteners of the invention. For example, the multiple property fastener can have an engagement zone covering approximately one half of the fastener area in the longitudinal direction and a non-abrasive zone covering approximately the other half of the fastener area in the longitudinal direction. Similarly, the multiple property fastener can have an engagement zone covering approximately one half of the fastener area in the lateral direction and a non-abrasive zone covering approximately the other half of the fastener area in the lateral direction. Alternatively, the multiple property fastener can have an engagement zone covering a central portion of the fastener area and a non-abrasive zone covering a perimeter that surrounds the central portion of the fastener area. The multiple property fasteners can also have more than two zones of fastening materials. For example, the multiple property fastener can be considered to be divided into a top portion, a longitudinal center portion and a bottom portion. An engagement zone of a first mechanical fastening material can cover the center~~

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~~portion and non-abrasive zones of a second mechanical fastening material can cover the top and bottom portions. In another example, the multiple-property fastener can be considered to be divided into an exterior portion, a lateral-center portion and an interior portion. An engagement zone of a first mechanical fastening material can cover the center portion and non-abrasive zones of a second mechanical fastening material can cover the exterior and interior portions.~~

~~The first mechanical fastening material is desirably selected to provide strong engagement with another surface. When the mechanical fastening material is a hook-type material, it is desirable to select a hook that provides strong engagement with a loop-type material. Types of hook materials that provide suitable engagement for use on absorbent articles are known. One feature of the hook materials that correlates to their engagement properties is the density of the hook material that would be used in an engagement zone. Suitable hook materials generally have from about 100 to about 4000 hooks per square inch (about 16 to about 620 hooks per square centimeter). Alternatively, the hook material has a density of from about 800 to about 2500 hooks per square inch (about 124 to about 388 hooks per square centimeter); more particularly, the hook material has a density of from about 1000 to about 2000 hooks per square inch (about 155 to about 310 hooks per square centimeter). Another feature of the hook material affecting strength of engagement is the height of the hooks of the hook material. Hooks acting as the first mechanical fastening material of the fasteners of the invention suitably have a height of from about 0.001 inches (0.00254 centimeters) to about 0.20 inches (0.51 centimeters). Alternatively, the hooks have a height of from about 0.015 inches (0.0381 centimeters) to about 0.03 inches (0.0762 centimeters).~~

~~Hook materials are typically produced using a process of continuous injection molding of a polymeric material, such as a polypropylene copolymer. Desirably, the polymeric material for the first mechanical fastening material is selected to have a flexural modulus greater than about 30 kilopounds per square inch (kpsi). More particularly, it is suitable for the hook material to have a flexural modulus of from about 50 kpsi to about 300 kpsi and, alternatively, of from about 150 kpsi to about 250 kpsi. Desirably, the polymeric material for the second mechanical fastening material is selected to have a bulk flexural modulus in a range of 7 kpsi (48 MPa) to 30 kpsi (207 MPa), preferably 7 kpsi (48 MPa) to 25 kpsi (173 MPa), and more preferably 7 kpsi (48 MPa) to 15 kpsi (104 MPa).~~

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~~The second mechanical fastening material of the multiple property fastener of the invention is intended to be less abrasive and more skin friendly; that is, less likely to cause irritation when brought into contact with the skin. In order to provide the property of being less abrasive and more skin friendly, the second mechanical fastening material can be selected to have various properties and combinations of properties. One such property is the "aspect ratio" of the fastening material. The "aspect ratio" refers to the relative hook head density of a hook component. This ratio is related to the area of the engaging head of a hook that corresponds with the maximum instantaneous displaced area of a mating loop component as the hook head penetrates the loop component. In the context of the invention, it affects the feel of the hook component as the hook heads come into contact with a person's skin. The aspect ratio is measured as the aggregate hook head area divided by the overall area of the hook component. The hook head area is measured at an elevation above the hook backing that includes the maximum overhang of the hook head. In order to provide a non-abrasive fastening material, the hook component of the fastening material desirably has an overall aspect ratio, as defined herein, within a range of 40 to 55 percent.~~

~~As part of selecting first and second mechanical fastening materials for the engagement and non-abrasive zones of a fastener, it is desirable to maintain the overall flexibility of the fastener. One known parameter for measuring the flexibility or relative stiffness of a fastener is the Gurley stiffness value; it is desirable for the fastener to have a Gurley stiffness value of less than about 1000 milligrams. Alternatively, the multiple property fastener of the invention has a Gurley stiffness value of less than about 500 milligrams, alternatively of less than about 200 milligrams or alternatively of less than about 75 milligrams. When a mechanical fastening material has a relatively high flexural modulus, the overall fastener tends to have a relatively high Gurley stiffness value. Therefore, when the polymeric material from which the mechanical fastening material is formed has a relatively high flexural modulus, it is desirable to alter other aspects of the fastener to lower the Gurley stiffness. For example, the base sheet material of the mechanical fastener material can be selected to be thinner. For example, the base sheet material may have a thickness of from about 0.001 inches to about 0.020 inches (about 0.00254 centimeters to about 0.0508 centimeters), alternatively of from about 0.002 inches to about 0.015 inches (about 0.00508 centimeters to about 0.0381 centimeters). Other aspects of the mechanical fastening material that can be~~

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~~altered include hook orientation (when the fastening material is of a "hook" type), spacing, backing thickness, hook thickness and the shape (or configuration) of the fastening material.~~

~~Fasteners are typically designed to deliver specific peel and shear values to ensure good performance. Good performance entails remaining fastened during application and wear and being removable by the wearer or caregiver at the appropriate time. In some applications, it may be desirable to have the multiple property fastener engage directly into the outer cover material of the article. In those situations, the outer cover material (or exterior surface of the backsheet) desirably also has a Gurley stiffness value of less than about 1000 milligrams.~~

~~The multiple property fasteners of the invention are capable of reducing the incidence of skin irritation without compromising the performance of the fastener. In order to reduce the incidence of skin irritation, the non-abrasive zone(s) of the fastener is located in the areas of the fastener that are most likely to come into contact with the skin of the wearer or caregiver. The various zones of engagement and non-abrasiveness within the multiple property fastener can be achieved using manufacturing techniques and different materials. Different materials can be combined during manufacture of the hook component to form rows of hooks having different properties. Rows of hook component in the multiple property fastener can be formed in the longitudinal and lateral directions in such a way that each row has a different property with respect to engagement and non-abrasiveness. Rows of hooks can be formed in such a way that each row has an increased degree of engageability over the row formed before it. In some cases, the increased engageability is achieved by forming hooks with increasing stiffness. In some cases, reduced abrasiveness is achieved by forming hooks with decreased stiffness. When stiffness is the distinguishing criterion between engageability and non-abrasiveness, the stiffness gradient can be formed so that the most flexible hooks are located in the portion(s) or zones of the fastener most likely to come into contact with the skin. In addition to actually forming the hooks to have different properties along adjacent rows, the hook component can also be fabricated in sections. Separate sections of a hook component can be formed to have different properties and the separate sections can be later assembled.~~

~~Therefore, the present invention includes a disposable absorbent article that includes an outer cover, a bodyside liner and an absorbent core located between~~

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~~the liner and the outer cover. The article includes at least one multiple property fastener located on the outer cover. The multiple property fastener includes at least one engagement zone of a first mechanical fastening material and at least one non-abrasive zone of a second mechanical fastening material. The multiple property fastener is configured to refastenably secure the article on a wearer. The article can also include an engagement surface on the outer cover that extends beyond a pair of laterally opposed side edges to form a pair of front ear portions. The multiple property fastener can engage one or both of the front ear portions. In addition to being refastenable, the article can be provided in a prefastened configuration for application as a pant. When the article is provided in a prefastened configuration, the multiple property fastener can be oversized and engageable into either a front waist region or a back waist region of the article. The multiple property fastener has a top edge that is generally aligned with a waist edge of the article. The multiple property fastener is oversized to provide stability between the front waist region and the back waist region and to maintain the pant-like, prefastened configuration.~~

~~Prefastened diaper pants have the capacity and absorbency of diapers, but their prefastened configuration makes them capable of converting between diaper and pant for donning and removal. With some prefastened executions, the fastening feature is pre-attached to a loop component or other material in either the front or rear waist region of the article. Occasionally, the prefastened configuration results in an ear portion getting folded inward, thereby potentially exposing a hook component of the fastener. With the multiple property fasteners of the invention, the more flexible area of the hook component would be located in the area likely to come into contact with skin. The multiple property fasteners of the invention can therefore be used to reduce irritation and red marking of the skin. In addition to using traditional hook and loop components, the multiple property fasteners could also be fabricated using adhesive or tape materials.~~

~~Keeping in mind the usefulness of multiple property fasteners for a variety of article configurations, the present invention is also directed to a prefastened absorbent article that utilizes a large, multiple property fastener on an outer surface to provide a single source of closure for the prefastened absorbent article. The outer surface to which the large, oversized fastener is attached can be in either the front waist region or the rear waist region of the absorbent article. When the oversized fastener is brought forward or backward for engagement with an outer~~

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~~surface of the article, the oversized fastener is capable of fastening into any portion of the outer surface. The portion of the outer surface can include an ear panel. However, the need for a specific attachment region or target attachment zone can be eliminated. Consequently, use of the oversized fastener of the invention could potentially eliminate the need for a loop component or other "mating" fastener component. The increased size of the oversized fastener also can eliminate the need for secondary fasteners or bonded areas (such as passive bonds) that may be required to stabilize the overlapped waist regions of the diaper and to aid pulling the article over the hips of a wearer. The oversized fastener can be configured to have one or more non-abrasive zones around its perimeter so that there is no skin irritation if the oversized fastener is inadvertently misaligned or otherwise comes into contact with the wearer's or caregiver's skin.~~

~~Use of an oversized fastener reduces the manufacturing complexity of a prefastening absorbent article. Fastening materials typically have a moderate to high cost associated with them. Consequently, it is sometimes desirable to minimize the size of a fastener component. In the case of prefastened absorbent articles, reduction in the size of the fastener or fastener system has led to the use of additional bond points or dual fasteners to stabilize the overlapped portions of the front and rear waist regions. The addition of bond points or dual fasteners can increase the complexity of the manufacturing process by making registration and alignment more difficult and by requiring additional material applicators.~~

On page 10, lines 13 through 21, please amend as follows:

Fig. 3 representatively shows a plan view of the prefastened absorbent article of Fig. 1 in an unfastened, stretched and laid flat condition with the surface of the article which contacts the wearer's skin facing the viewer and ~~with portions of the article partially cut away to show the underlying features;~~

Fig. 4A-4I representatively shows front plan views of various examples of multiple property fasteners that can be used with the prefastened absorbent articles of the invention. The multiple property fasteners can have zones of different hook materials. The multiple property fasteners can also have zones of engagement hooks and non-abrasive hooks in different configurations as depicted in the Figure;

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On page 10, lines 33 through 35, please amend as follows:

Fig. 8 representatively shows a partial plan view of a prefastened absorbent article of the invention in a flat position in order to illustrate the relationship between the multiple property fasteners of the invention and the front waist region of the article.

On page 32, line 22 through 26, please amend as follows:

Desirably, the oversized multiple property fastener 60 has a length in the fastener longitudinal direction 62 sufficient to bring the edge of the fastener within about 1 inch (2.54 cm) of the waist edge 32 of the article. The distance between the oversized multiple property fastener 60 and the waist edge 32 is indicated in Fig. 8 by reference numeral '79'. Generally speaking then, the oversized multiple property fastener 60 has a top edge that is generally aligned with a waist edge 32 of the article.